FEBRUARY 1985 VOL. III No. 4

+ + WHAT'S INSIDE + +

* * SINCUS ACTIVITIES * *

—GLASSES— —MEETINGS— —HARD/ZX81—

[Programming, etc.] *[Main Thing!!]* *[Hardware+TS1000]*

THURSDAY February 28 7:00 PM Vestal Library	WEDNESDAY February 20 7:00 PM Chase/First Bank	SUNDAY February 24 1:00 PM Vestal Library
THURSDAY March 28 7:00 PM Vestal Library	WEDNESDAY March 20 7:00 PM Chase/First Bank	SATURDAY March 23 1:00 PM Vestal Library
We will continue to schedule the programming class if YOU want it!!	WEDNESDAY April 17 7:00 PM Chase/First Bank	SATURDAY April 27 1:00 PM Vestal Library

The Executive Committee of SINCUS meets the first Wednesday of the month at the Vestal Public Library at 6:30 PM unless otherwise stated in advance. Any regular SINCUS member is welcome!

NEW NEWS from the Newsletter swap

'e following is from "SUM" The Sinclair/Timex Users ,gazine,3224 NW 30th Avenue, Gainesville,FL 32605 $12 @ year: "...LIST (Long Island Sinclair Timex UG) reports sucessfully interfacing the Sinclair Microdrives to the 2068 using the EMU-1 Specrtum emulator and Spectrum buss, which was described in the Dec/Jan issue of LISTing...Doug Dewey of the Triangle UG of North Carolina reports no success with several drives on his 2 2068s...SUM reports receiving the Rotronics Waferdrives but have not had luck in a 2068 or Spectrum mode...Sinclair had a booth at the CES, Las Vegas and displayed the Sinclair Spectrum+ Computer (a Spectrum in a QL keyboard). Doug Dewey and Don Barnard (TS Services) were told that Sinclair is considering marketing the Spectrum+ in this country...Ray Payne of Knighted Computers says the Microdrives are selling like crazy..." much more in the issue, a parallel printer I/F and a beginner programming guide, read it in the library-if you like it subscribe!

The first six issues of the "Hacker", the newsletter from the Las Vegas TSUG is available in the library, quite a number of interesting programs in their letters.

From CCATS UG,Oregon City, OR "...Disk drive news...3-4 weeks before Aerco or RAMEX IF will be ready to order...review of A&J Mircodrives...load and save times are cut by 1/2 to 2/3 depends -- were tape stops...up to 9 programs saved on tape depends on ,th of tape and programs, programs can be changed if length is same. 100% reliability to date..."

Communication from T.S. Services-Knighted Computers is sole licensee for Quicksilva TS 2068 programs...New Tech Times, a PBS TV show, will air segment #210, this spring?? on Timex Users Groups, watch for it...Sinclair QL might be in USA 1st quarter 1985...Dave Higgonbottom raising cash to buy the TS line from Timex, TIME STAR, with a minor correction, may yet be this year...Sinware announces HOT-Z-AROS-cartridge version of 2068 HOT-Z,write Sinware,Box 8032, Santa Fe,NM 87504.

Don Lamen, Windsor,NY reports Radio Shack at the Vestal PLaza was selling TI 99/4A keyboards for $2.99 each-sold out but expect more soon.

-<<<<<<<<<<>>>>>>>>>>-

How come dept...why is it when you were looking for a computer to buy no one could offer you advice on which to buy? ...but after you find one you like, buy it, everyone but everyone can list the reasons why you shouldn't bought that one...

-<<<<<<<<<<>>>>>>>>>>-

NEW ! Discount Computer at the Small Mall, JC recently opened... always looking for new places to window shop. I stopped in and r `hi-their stock is limited as they just opened, but by the ι of Feb, it should be an interesting place to shop.The manager Tom Yeager mentioned user group discounts ,I'll get details later.

E. Arthur Brown's latest catalog is in the mail to get on the mailing list-write EAB-3404 Pawnee Drive, Alexandria, MN 56308 from this catalog "...Mikrodrives for the TS1000,2068 and Commodore 64,...11K baud rate, uses mikro-wafers -looped tapes with a 1.4K storage rate per foot- 62 ft. tape is $4.50-drive is $199.95,addon drive is $124.95...last issue was in error about Sinclair's marketing plans, no ZX81 or Spectrum in US, just the QL and possibly the Spectrum+...you can order to EAB thru MCI Mail using your modem...Z80-6502 Cross assembler for 2068 for $24.95...hardware...software and books! 1000...2068 and Spectrum products"

"The English Micro Connecetion ",EMC, 15 Kilburn Court, Newport Rhode Island, 02840 tele:401-849-3805 sent us several of their Winter catalogs via Wes Brzozowski's connection...I will list a few items to wet your whistle...ZX Spectrum Plus-$155...ZX Spectrum Expansion system-$125(has Interface I,a microdrive unit, 6 cartridges) ZX Spectrum IF-$45,cable $14...RGB Module-$48, a Damco/Rotronics Wafadrive for the ZX Spectrum-$164.95(has 2 128K drives,centronics IF, RS232 IF, Word Processor prog.) Software for the ZX Spectrum-utilities,tool-kit,editor/assembler and MC test tool-each 12.95 Stock Manager -24.95, Address Manager 24.95 for 80 col, 11.75 for 32 col.,Finance Manager-24.95, Lords of Midnight,Sabre Wulf,Under Wurlde-12.95 each,The Romswitch-$45, EMU 1 Emulator-$45, EMU 4 microdrive adapter-$30, Specrum languages-Micro-prolog-32.50 ,LOGO-62.50, Pascal-32.50, "c"-32.50,DLAN-12.95, Fifth-12.95, and more S&H a $1 per software,no S&H on hardware) Bob Dyl is exec director.

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NOTE: Any product we mention is not an endorsement,we are simply getting others' views as much exposure as possible-if you disagree with anything here in FINE!! Write and let us all know your opinion and ideas. Any questions? Write...we would like to hear from users of microdrives on what to expect from them and is there a problem with data loss on the tapes? If you write let us know how long you have had the Microdrives. And if you buy any product you see here from any listed dealer let them know where you saw it listed, Thank you.

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Some may wonder how this is all possible from "Owego" [NOT Oswego!!!!] New York. First, SINCUS is based in the "Triple Cities" (Binghamton, Johnson City, and Endicott) an area that has the most high tech industry of ANY metropolitan area in New York state and is one of the four or five "silicon valleys". For those of you that don't recognize the names of the cities - the Endicott area is the original home of the Endicott Time Clock Co. - known today as the "I"tty "B"itty "M"achine company. But Binghamton is also the original home of "Link" (today Singer-Link) the company that builds those "computerized" flight simulators. Not to mention Universal Instruments, General Electric, and Raymond Corp. (they build computerized stock room movement systems!), just to name a few. One of our members is the president of the IBM Microcomputer Club! But our loyalties remain with the Sinclair.

SECRETARY'S REPORT

==========

I would like to apologize for the mix up on time of the Meet scheduled on January 26-the newsletter said 10 am ,it was supposed to be 1 pm-I did not notice it until about 1:45 pm at the library, when Dave Schoenwetter pointed out to Gary Ennis that several people had showed up at 10 am. I am sorry to those who had gone out in this weather for zip-I talked with Dennis Dale who was to lead the instruction and he hopes that those interested will come to the next instruction in February, and he has a lot of items to show and will go beyond soldering into the world of wire-wrap. Again, sorry about the mix-up in meeting time. In the future, should a time or date be in question call me (798-7219) or Gary (1-687-0698) --Paul Hill

==========

SINCUS met at 7pm on Tuesday, January 15 at the Vestal Public Library for programming class, and at 7pm, Wednesday January 16 at the Chase-1st City Bank, Vestal Parkway at Murray Hill Road, Vestal, for the regular monthly meeting, 18 attended. Please note it was 3 degrees out when the meeting ended at 10pm.

The D. Lipinski "Software Buyers Guide to Sinclair Timex Products and Services" arrived in the mail just before the meet. A list at the meets will be posted-if you want to use the Guide-sign up-keep it 5 days and pass it on to next on the list. Your name and phone number and its up to you to call the next one on the list, last one brings it to the next meeting.

Glenn Wilson, Treasurer, made the annual report for 1984. His efforts in the visual aids made clear where all the money comes from and goes to. The books are always available to any member for inspection. Thank you, Glenn.

Gary Ennis, President, needed shoppers for prices on printer paper and mailing labels. Format for the newsletter is now 64 columns. We are going with a new printer- a couple bucks more, but hopefully easier to read-and closer to Gary's home. Gary was driving 120 miles a month just on the newsletter production.

Dennis Dale will be giving classes in basic soldering and wire wrap. We have a lot of scrap parts to practice with over the next couple months, so if you're interested, come on down. That will be at the Vestal Public Library , 1pm, Sunday, Feb.24, TV room.

SPECIAL OFFER

COMPUTER SHOPPER is offering a 6 month rate of $5 thru user groups. We have the special subscription cards and will ha them at the next three meetings. All members will find the basi information in this issue, offer expires 7-31-85 make your check out to COMPUTER SHOPPER for $5.00 and either turn it in at the meeting or (so corresponding members CAN participate) mail it to SINCUS, P.O. Box 36, Johnson City, New York 13790. Act now as the COMPUTER SHOPPER is trying hard to support Sinclair products

Charlie Keoth demoed as promised his 2068 with clock. With his set up, 2068, modem, Gorilla Banana, and interfaces, Charlie included a clock chip. The idea came from an article in Computer & Electonics,"Fail-Safe,Real-Time Clock for the TRS-80 by John V C. Mein. Due to the differences in hardware between the TRS-80 and the 2068, several changes had to be made. Using Dave Schoenwetter's(SINCUS)design for a centronics interface, Charlie built the interface with a MSM5832 clock/calendar. He also rewrote programming for updating and reading the clock for the 2068. With a flip chart of the project showing the planning that you should put into any worthwhile project, he may keep one or two of us from stubbing our toes on similiar problems.

Clyde Tackley brought in his Byte-Back modem and some tapes of messages off Compuserve. He demoed how to down load programs from Compuserve. Uploading is also possible. In addition to the the modem you also get a RS232 interface.

From "Computers & Electronics" (2/85) , Rumors & Gossip ...Sinclair seems to be developing a new microprocessor chip with parallel processing and RAM on board...don't look for it before 1989.

Gary Ennis posted a bulletin on Compuserve about Dave's Phone patch in SINCUS NEWS- we got several new members as a result! Dave's revising the code-it was supposed to be read across the page, but some read down. It creates a small problem with auto-dial and Dave is working on that plus rewriting the code to a data statement.

Last month I wrote my favorite filtering statement for menus and keeping the program from crashing-I got some input from Gary and Dave on this one-Dave had this

```
10 PRINT " MENU SELECT 1 or 2 "
20 IF INKEY$ = "1" THEN GOTO (or GOSUB) Line number
30 If INKEY$ = "2" THEN GOTO  "    "    "    "
40 GOTO 10
```

Gary this:

```
10 PRINT "MENU SELECT 1 or 2"
20 LET Z$=INKEY$
30 IF Z$<"1"OR Z$ > "2" THEN GOTO 10
```

My final choice:

```
10 PRINT "MENU SELECT 1 or 2 "
20 IF INKEY$ <> "1" AND INKEY$ <> "2" THEN GOTO 10
```

From this I learned:

1. If you use letters-with the 2068 you gotta set up for caps or lower case or poke 23658,8 and then a 0 when done. So use #'s.
2. The number of bytes saved is half-my old choice last month / this month's.
3. Any body who has done this has a better way...

I'd like to hear of any others. Also found out via Gary that the Invalid color is a default error. Thanks Gary.

Default? (Gary's note-what it says when it has no other answer?)

From SINCUS member, Art Mortensen,NYC- Art dropped a note with some ideas and some questions...he tapped the 2068's speaker via a mini-jack he put next to the monitor port-also put a 10K 1 watt resistor at the jack as out put is on the high side. He would like to know about the Timex Tech Manual's listing for 64 columns-would any one care to write an article how how to read the Tech-Manual? I'd suggest Jeff Mazur's Intermediate-Advanced Guide as warm up material. Any one know of disc interfaces under $300 with drive?Any better keyboard for the 2068 ? Channel your answers to the newsletter so all can learn. Art has several books on the 1000, 16K RAM, 1000 software he would like to trade for Vu-File and Vu-Calc cartridges. Contact me for details.

Welcome to new members-John Mattimore and Ted Scarinzi (local) and Jack Roberts of Cincinnati, ,Ohio; Art Mortensen of NY,NY; Richard Martin of San Antonio, Texas; and Ed Lanctot of Norwood ,NY; (corresponding).

view from here is-GREAT-our membership locally and nationally is growing-the number of businesses supporting our computers is GROWING or we are becoming more aware of the numbers as our newsletter reaches out and the swap/newsletters come in. A year ago all was very dim with a watch company pulling the plug on our support system-but our light ain't out yet! The best is yet to come, if we don't screw up meeting dates or shoot ourselves in the cursor-we'll be around !

Paul Hill,Rec Secty
SINCUS

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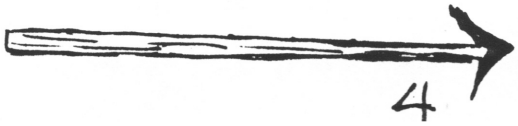
FOR SALE

2 - 2068's...$85 @: 2050 modem...$85: Tasman I/F...$65
Comrex CR 5400 Monitor (Amber) ...$80:
Olivetti PR2300 ink jet printer...$175:
Flight Simulator $17 (cartridge) $10 Cassette:
Budgeter $12 cartridge: Checkbook manager $7 cassette:
Vu File $10 cassette: all total $631 call for price on whole package. call Jim Lamb after 5pm 723-6931

. . . . . .

I 'program" will allow you to use SMART II software with the AERCO Interface and an Epson printer, Gemini printer, and Gorilla Banana printer. (Other models have not been tested, but similar models should work). Try it and let SINCUS NEWS know how it worked.



CORRECTED
MTERM PATCH FOR AERCO I/F

```
 100 INPUT "DO YOU HAVE MTERM CO
DE LOADED?"'"          yes/no
    ";A$
 110 IF A$="yes" THEN GO TO 4000
 120 PRINT "PLEASE LOAD MTERM CO
DE AND RUN"
 130 STOP
4000 RESTORE 4100
4010 FOR f=59173 TO 59175
4020 GO SUB 4500
4030 NEXT f
4040 FOR f=59188 TO 59190
4050 GO SUB 4500
4060 NEXT f
4070 FOR f=58618 TO 58833
4080 GO SUB 4500
4090 NEXT f
4092 PRINT '''''"SAVE YOUR ALTE
RED MTERM ON TAPE"
4093 PRINT '''
4094 PRINT "DAVE SCHOENWETTER"
4095 PRINT "1335 FARM TO MARKET
RD."
4096 PRINT "ENDWELL, NEW YORK, 1
3760"
4099 PRINT '''"all done": STOP
4100 DATA 195,126,229
4102 DATA 195,178,229
4104 DATA 42,232,238,237
4106 DATA 75,236,238,3
4108 DATA 125,185,32,7
4110 DATA 124,184,32,3
4112 DATA 195,80,229,62
4114 DATA 127,219,254,31
4116 DATA 210,80,229,219
4118 DATA 127,230,16,32
4120 DATA 242,126,254,10
4122 DATA 32,2,62,0
4124 DATA 254,12,32,2
4126 DATA 62,0,205,48
4128 DATA 229,35,195,2
4130 DATA 229,0,211,127
4132 DATA 0,219,127,201
4134 DATA 0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0
4136 DATA 0,0,62,13
4138 DATA 205,48,229,62
4140 DATA 13,205,48,229
4142 DATA 62,13,205,48
4144 DATA 229,33,117,239
4146 DATA 54,13,6,32
4148 DATA 43,54,32,16
4150 DATA 251,125,50,231
4152 DATA 238,201,33,195
4154 DATA 229,126,167,32
4156 DATA 4,62,35,119
4158 DATA 201,175,24,251
4160 DATA 203,79,194,40
4162 DATA 231,245,197,229
4164 DATA 42,176,229,237
4166 DATA 75,174,229,237
4168 DATA 66,32,4,225
4170 DATA 193,241,201,219
4172 DATA 127,230,16,32
4174 DATA 246,10,205,48
4176 DATA 229,3,62,96
4178 DATA 184,32,3,1
4180 DATA 0,94,237,67
4182 DATA 174,229,24,227
4184 DATA 0,94,0,94
4186 DATA 229,219,115,254
4188 DATA 12,40,4,254
4190 DATA 10,32,1,175
4192 DATA 245,42,176,229
4194 DATA 119,35,62,96
4196 DATA 188,32,3,33
4198 DATA 0,94,34,176
4200 DATA 229,241,225,201
4510 READ a: POKE f,a
4520 PRINT f,PEEK f
4530 RETURN
```

COMPUTUS INTERRUPTUS

-OR THE JOY OF USING INTERRUPTS ON YOUR COMPUTER

By Wes Brzozowski, SINCUS

PART TWO

Response to Part One of this series has been quite gratifying so far. However, from what I've heard, it seems that a little "fine tuning" of the format is in order. Essentially, we'll do fewer things in each installment, stretch the series out longer, and give a little more attention to detail. This'll give those new to the subject a little more help and time to catch up. It also means that we won't cover as many things this time as promised, but it will all get done, eventually. Those who are particularly anxious to get on with it should feel free to collar me at SINCUS meetings, with their questions.

I hope readers who own or have access to a TS2040 printer have tried out the demonstrator program. If not, it would be worthwhile to do so before reading further. While we're discussing the last installment, I'd like to call your attention to the second paragraph in the right hand column on page 8. An important sentence has been left out. It should read, "One thing I haven't mentioned is that the address assembled from the I-register and the data bus is NOT the address of the interrupt handler! It's the ADDRESS OF THE ADDRESS of the interrupt handler."

Now back to the questions:

#6 HOW DOES THE DEMONSTRATOR WORK?

Pretty well! Seriously, let's first look at what the demonstrator sets up in memory, and then we'll see how it all works together. Understanding this description will require a bit of knowledge of machine code, but only a bit. The demonstrator has been written to be understood by as wide an audience as possible. (That audience will also need a little persistence, though)

Line 30 CLEARs the necessary space for the interrupt software. Line 40 fills memory locations FE00 to FF00 with FD. Line 50 places a JP FF08 instruction at location FDFD. Lines 60 and 70 load the following machine code, starting at location FF01:

```
ADDR HEXCODE LABEL MNEMONIC
FF01 3EFE        LD A,FE
FF03 ED47        LD I,A
FF05 ED5E        IM 2
FF07 C9          RET
FF08 F5          PUSH AF
FF09 C5          PUSH BC
FF0A D5          PUSH DE
FF0B E5          PUSH HL
FF0C 3E7E        LD A,7F
FF0E DBFE        IN A,(FE)
FF10 F6E0        OR E0
FF12 FEFC        CP FC
FF14 2006        JR NZ,FF1C
FF16 F3          DI
FF17 06C0        LD B,C0
FF19 CD05 0A     CALL 0A05
FF1C E1          POP HL
FF1D D1          POP DE
FF1E C1          POP BC
FF1F F1          POP AF
FF20 C33800      JP 0038
```

I've divided the code into five blocks, whose meaning will be explained shortly.

Line 80 executes machine code at location 65281, which, not so coincidentally, is equal to location FF01 in the machine code listing. Only block #1 is executed, since it ends with a RET instruction. Block #1 loads FE into the I-register, and sets the machine into interrupt mode 2, whose operation was explained last time.

From here on, the TS2068 is doing something new that it does not ordinarily do. Every time an interrupt occurs, the machine has to find out where it is to execute the interrupt code. It gets the upper byte of an address from the I-register and the lower byte from the data bus. This combination is the ADDRESS OF THE ADDRESS of the interrupt handler. It will become clearer (hopefully) as we "walk through" what happens.

When the TS2068 gets an interrupt, it looks to the I-register and the data bus to generate the address FExx, where xx is a number that is not known because the TS2068 mysteriously puts different values on the data bus at different times. The TS2068 will then look to memory location FExx for the address of the interrupt handler, and then run the code wherever that happens to be.

However, the BASIC program filled all memory locations from FE00 to FF00 with the number FD, so no matter what value FExx pens to be, the TS2068 will find FDFD when it looks there!]... is where it will start to execute the interrupt handler.

Unfortunately, FDFD is just 3 bytes less than FE00, where the "kluge block" of FD's is located. There's not room for much code, but there's just enough space for the JP FF08 instruction that the BASIC program put there. This means that the interrupt handler will continue at location FF08, or, block #2 in the machine code listing. (It gets a lot simpler from here on, honest)

If the explanation seems murky so far, it's O.K. to forget it for awhile. Just take my word for it that the aforementioned code makes it appear that an interrupt will cause code to be executed at location FF08. This is where our true interrupt handler is to be found.

The handler begins with block #2, which saves all of the registers. We do this so that we can leave them as we found them when we're done. This will ensure that we don't disrupt the program that was running when the interrupt occurred.

Block #3 reads a small portion of the keyboard. We won't cover keyboard scanning here (see SYNTAX Feb. 1984 for a tutorial on the subject) but block #3 causes block #4 to be skipped if the BREAK and SYMBOL SHIFT keys are not being pressed simultaneously.

Block #4 causes the screen to be copied. Before CALLing the screen copy routine in ROM, we load B with the number of pixel lines to be copied. Changing this would allow us to COPY part of the screen.

Block #5 prepares the computer to leave our interrupt handler. All registers are restored to their original values. Note that the first item that POPs off the stack is the last item that was PUSHed on. This means the registers must be restored in reverse order.

Ordinarily an interrupt handler ends with RETI (similar to RET) instruction. In this case, we'll end it with a JP 0038, which jumps to the normal interrupt handler. This allows the nal interrupt functions of keyboard scanning and updating the system variable FRAMES to be performed.

#7 YOU MENTIONED COPYING ONLY PART OF THE SCREEN. HOW IS THIS DONE?

By loading a different number into the B register before CALLing the COPY routine. You can change the number of lines printed in the following way. Suppose that LINES=the number of lines of characters (from the top of the screen) that you want to COPY. Just POKE 65304,(8*LINES). The handler is now setup to COPY only part of the screen.

#8 WHAT OTHER THINGS CAN AN INTERRUPT HANDLER DO?

By reading the system variable FRAMES, which is incremented every 1/60th of a second a nice real time clock can be made, that flashes the time up on some unused part of the screen, even when you're running other programs. FRAMES isn't updated when the interrupts are disabled, so the clock "stops" whenever you use cassette I/O, the TS2040 printer, or the BEEP command, and resumes when you are done. Still, it's a free, "software only" clock.

If the interrupt handler were linked to a hardware real time clock, like the one demonstrated by Charlie Koeth at the January SINCUS meeting, the clock wouldn't stop at all.

Among other uses is an item called a print spooler. Printers are very slow compared to the computers running them, and the computers spend most of their time waiting while the nter is running. It's possible to send LPRINT commands to a fer area in memory, and have the interrupt handler "pick up" this data and print it one character per interrupt.

This would allow the printer to run at up to 60 characters per second while you're doing other things with your computer. In other words, you could be running or entering a program at the same time as the computer is printing something else. Those who've used such a feature on an IBM PC or other computer will agree that it is a great time saver.

Another use is a program that reads and "stacks up" keyboard entries before the computer requires them. When an INPUT is needed, it gets it from this stacked up data. This is called a keyboard buffer, and it's also very convenient.

SINCUS-Sinclair Computer Users Society

Founded in 1982, the club seeks to help owners/users of the Sinclair and TIMEX/Sinclair computers learn how to use their com puter, obtain third party support and provide group purchasing power, provide product reviews, maintain contacts with other user groups around the world and help with mail order purchase problems. SINCUS publishes a monthly newsletter. For the 1984-85 the officers are:

President	GARY ENNIS	(607) 687-2241 (9-6 daily)
		(607) 687-0698 (home)
		Compuserve ID # 74666,1246
V. President	GARY COLE	
Rec. Sectry.	PAUL HILL	(607) 798-7219
Fin. Sectry.	GERALD KNICKERBOCKER	
Treasurer	GLENN WILSON	
Trustee	JOHN SIMS	
Trustee	Dick Petrak	

Since the interrupt is synchronized to the video display, it's possible to change the BORDER color some fixed time after the interrupt, and obtain a "full screen horizon" that extends into the border area. The Spectrum game "Aquaplane" does this, but the required timing may be different to make the effect work on the TS2068's 60 Hertz interrupt. (The Spectrum uses a 50 Hertz interrupt.) I've not seen the game working on a TS2068, but the effect is still available to us.

These are items that come immediately to mind. Other less obvious uses are out there. One that I'm considering involved my software that makes BASIC work in the 64 column mode. Certain keyboard inputs cause the computer to change a system ad dress table in an undesirable manner. I expect to use the inter rupt to "change the table back" before any harm is done.

There are many other uses.

A PROLOGUE

Doug Dewey, member extraordinaire, of the Triangle Sinclair User's Group, tells me that merely adding pullup resistors to a Spectrum emulator, as suggested last time, doesn't clear up all of the problems related to certain "unrunnable" Spectrum programs. He's sending me copies of some programs, and I'll be checking them out especially in understanding the way the Spectrum handles the data bus during interrupts, and whether my "fix" works as expected on all machines.

Next time (or in later installments) we should be looking at the problems of relocating the demonstrator code, of the (solvable) problem of doing something like the demonstrator on a TS1000, and constructing hardware to make use of the TS2068 non-maskable interrupt. Those looking for a challenge should try to relocate the demonstrator to reside in the 16-32K memory region. When a certain part of the interrupt software resides in the same 16K region as the display file, something interesting happens. It still works, but.....

Wes Brzozowski
SINCUS

COMPUTUS INTERRUPTUS

```
10 REM Demonstrator Program
20 REM Causes a COPY-screen
       when BREAK & SYMBOL
       SHIFT are pressed at
       the same time
30 CLEAR 65020
40 FOR j=65024 TO 65280: POKE
j,253: NEXT j
50 POKE 65021,195: POKE 65022,
8: POKE 65023,255
60 FOR j=65281 TO 65314: READ
k: POKE j,k: NEXT j
70 DATA 62,254,237,71,237,94,2
01,245,197,213,229,62,127,219,25
4,246,224,254,252,32,6,243,6,192
,205,5,10,225,209,193,241,195,56
,0
80 RANDOMIZE USR 65281
```

Type in and RUN - then load you favorite program - when you want a picture of the maze or etc. P RESS [redacted] and [redacted]

AN EXTRA SIMPLE SPECTRUM EMULATOR

-by WeS Brzozowski, SINCUS

No one wants to be called simple, or cheap. Yet where engineering solutions are concerned,both of these things are virtues of immeasurable value. The method described here is the cheapest and simplest emulator yet, if we don't count merely swapping ROMs inside the TS2068. Among methods that allow switching between the Spectrum and TS2068 modes, its definitely the simplest and cheapest, and I think it's also the best. Still, that last statement may be debated, depending on what you prefer.

In the October 1984 issue of SINCUS NEWS, I proposed a method of producing a cartridge based emulator that used a Spectrum ROM, where mode switching is performed through software. Doug Dewey of the Triangle Sinclair User's Group, was the first to actually try this method out, and he's redesigned his emulator to accomdate it. I suspect that the majority of readers prefer programming to soldering; no one has damaged their TS2068 with a bad program after all. For these people, I'd recommend you contact Doug for details on his product. Nevertheless, for those who'd like to "roll their own", I've provided instructions to do just that -- requiring no electronic components except one Spectrum ROM !

This further simplification of my emulator method means that less wiring will be required. Such a feature will be especially useful to those just starting out in building electronic projects. For those who don't mind things being a little more complicated, the optional seven resistors make the TS2068 act a little more like a Spectrum. (The TS2068 does weird things to the data bus when there's no hardware writing to it, while the Spectrum, puts an FF there. Those with access to a real Spectrum can try PRINT IN 0 on both computers, to see the difference.) I have actually seen software in which these resistors matter. Certain software methods using interrupt mode 2 form a prime example.

Those with some technical knowledge of the TS2068 may have a few questions about this method. I'll try to anwser some of the more likely ones here.

First, the code in locations 0001-0004 of a Spectrum ROM does not follow the format specified for the cartridge memory in the TS2068 technical manual. Actually, this is very fortunate. If we walk through the initialization code where the cartridge memory is checked, we see that if the "standard" format is not followed the computer simply assumes that no cartridge is present and continues on. Thus turned on, it "wakes up" as a TS2068. Because of this, we can use software to switch back and forth. If the standard format were followed, it would not be possible to switch from the Spectrum to the TS2068 mode without some sophisticated machine code.

Second, as shown, the Spectrum ROM is not uniquely mapped into the computer's memory. That is, it is mapped simultaneously into the 0-16, 16-32, 32-48 and 48-64K blocks of memory. However, in normal use, only chunks 0 and 1 of the cartridge bank will be enabled, and so the TS2068 itself performs the additional mapping, so that the ROM occupies only the 0-16K area, as it should.

There is evidence that Timex intended to do this in it's own cartridges. Cartridges could have been either AROS, starting at location 8000. The byte at location 0001 should be 01 to identify an LROS, and the byte at 8001 should be 02 to identify a LROS. In either case, this is the second-to-the-lowest byte of of ROM memory. Note that the format could have been simplified by using 01 to identify either, but this would not have been so if the ROM were mapped into multiple blocks. The difference between the two I.D. bytes is probably intended to tell the TS2068 where it should "map" the ROM, by enabling the appropriate cartridge bank chunks. By also locating decoupling capacitors right next to the cartridge connector, Timex ensured that a program that could fit on one ROM would require only one ROM on a board, and nothing more. (Programs requiring two ROMs would have required a third mapping chip.)

I expect that it's not just a happy coincidence that the standard ROM configuration includes three "low true" enabling lines, and that to enable the cartridge ROM we must simultaneous ly have a active "low true" signals; MREQB, RDB, and ROSCS. Unfortunately the standard EPROM has only two "low true" enabling lines, so this one chip method won't apply to EPROMS.

A third possible question may relate to the lack of a pullup resistor on D2. If we review the TS2068 schematic, we see that D2, and only D2 already has a 10K pullup resistor; we don't ne to add one here. This is probably used during the system initialization, when the TS2068 is building the system configuration tables, and is searching for the expansion banks that Timex never produced (poor dumb machine !) A ROM bank is identified by bit 2=0 in a certain location. A missing bank would have bit 2=1 due to the pullup resistor. Since no other pullups appear necessary, Timex didn't include them.

A last question may relate to the lines of BASIC next to the schematic. They're intended to be entered in the immediate mode; don't try to put line numbers on them and SAVE them. Such a cas sette switch won't work. If you want a cassette switch, you can use this program instead:

```
10 CLEAR 39999
20 DATA 175,24,2,62,3,243,211,
244,199
30 FOR J=40000 TO 40008: READ
a: POKE J,a: NEXT J
40 PRINT "Press S for Spectrum
": PRINT "Press T for TS2068": B
EEP .1,11
50 IF INKEY$="S" OR INKEY$="s"
THEN RANDOMIZE USR 40003
60 IF INKEY$="T" OR INKEY$="t"
THEN RANDOMIZE USR 40000
70 GO TO 50
```

You may find the "cassette switch" useful when you're getting started, but you'll quickly find the lines of BASIC by the schmatic to be easier.

The OUT 244, commands switch the Spectrum ROM in and out of memory, causing a system crash. The RANDOMIZE USR 0 commands initialize the system, allowing a "controlled crash" from which the system can recover, with the newly switched in ROM. This method is about as elegant as lobster with catsup, but it works beautifully, and is perfectly "legal".

That's about it. Those with additional questions can write to me

Wes Brzozowski
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Endicott, NY 13760

Please enclose a SASE for a reply. The truly anxious can call me at (607) 785-7007. Please DO NOT call collect. Please DO NOT call after 10pm Eastern time. I'll be glad to answer any questions.

NOTE: My articles are never bear any copyrights. I design and write bcause I enjoy it. Anyone wishing to manufacture and sell this item is free to do so, but I'd appreciate you're sending me one or two of the finished item as a courtesy. Have Fun !

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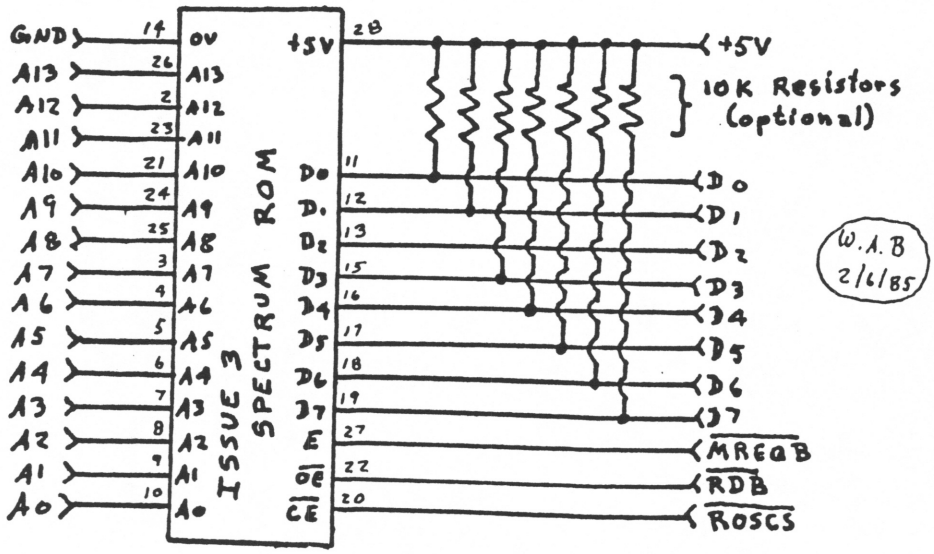
TS2068 TO SPECTRUM:

RANDOMIZE USR Ø
OUT 244, 3
RANDOMIZE USR Ø

SPECTRUM TO TS2068:

RANDOMIZE USR Ø
OUT 244, Ø
- when you get a [K] cursor, press ENTER. The computer will honk at you. Then:
RANDOMIZE USR Ø

(NOTE: The system will re-initialize after every RANDOMIZE USR Ø)



W.A.B 2/6/85

E XSIMYEMU

2K-EXPRESS

This has been a difficult issue to get out as my body had chosen this week to succumb to the local "flu". Many thanks to Paul Hill who drove out and helped with the typing. Additional thank yous go to:

CARL MORRIS - for his trip to Owego to report on the "paper purchase". In addition to his detailed report, he donated printer paper and labels to SINCUS, or this SINCUS NEWS might have been done on napkins!!

THOSE HAVING FULL SIZED PRINTERS AND WANTING TO BUY A CASE OF PAPER AS CHEAPLY AS POSSIBLE - COME TO THE NEXT MEETING AND BRING SOME MONEY!! Case price will be a little under $30. You will be able to pick up the paper at the February 28 class!

DAVE SCHOENWETTER - for his untiring efforts in attempting to work out the "bugs" in the SMART II modem software. I promise you that if you will use your TS2068 for telecommunications with a full sized printer you will have the "best computing dollar value on the entire personal computer market"!!! Even paying top dollar for a TS2068 and modem-you've got less invested than the price of a modem and software for all other computers. The singular reason is that Dave has taken hours to unravel this mysterious modem software. Dave has developed the "mterm" patch on page 4 that allows you to use your AERCO I/F with the 2050 modem. The next step (in March SINCUS NEWS) will be a Buffer Util ity program so you can fill the BUFFER and then save it to tape OR print it out! And the final step, which Dave has "somewhat" occomplished is the loading of the "saved buffer data" into TASWORD II. We are within a couple of months of you "authors" sending me your newsletter articles over the phone lines to my system even if I am not here!!!

WES BRZOZOWSKI - for his apparant solving of the inexpensive, build it yourself, Spectrum ROM Emulator. This device which will cost you $35 or so to build will allow you to switch your TS2068 back and forth to being also a "Spectrum". The advantage - very straight forward - Spectrum is probably the #1 selling computer in England with a ton of outstanding software (4,000 titles?). If you want the most up to date software for one of the world's most popular home computers-it is at your finger tips! Think about it.

"CLONE" - to be sold to SINCUS MEMBERS at February Meeting.

If you attended the January meeting you saw "CLONE" in action. Wes Brzozowski has officially "donated" CLONE to the 2K EXPRESS for the purpose of registering the copyright. 2K EXPRESS then donates all rights to SINCUS. SINCUS will be selling an initial supply of "CLONE" at the February meeting. COST to members will be under $10 (price could not be established at press time). If you have not seen "CLONE" please come to the meeting - it copies any Sinclair program for the TS2068!

SPECIAL "CLONE" SALES PROJECT

SINCUS will be making "CLONE" available to be sold commercially. Quite simply stated - if you would like to sell "CLONE", then send a proposal to SINCUS NEWS, PO Box 523, Owego, NY 13827 We invite all "entrepreneurs" to consider this chance and respond accordingly - if you're going to sell microdrives or disk drives then your customer needs a way to copy the cassette software to the new storage media!!! CLONE permits it at the press of "C"

STATE OF SINCUS REPORT

I now see nearly everything "online" and working that I first envisioned when I became President of SINCUS. The membership rolls are kept on VU-FILE and mailing labels are printed on a full printer. Meeting notes are part of the newsletter and kept as a file for TASWORD. SINCUS NEWS is being printed within two blocks of my business and is acceptable in a 64 character column format. SINCUS NEWS has much improved artwork and the production time is roughly 20% of what it was a year ago, the quality is better and the cost really is no more-except for the POSTAGE. In the next few days we will finally begin the "permanent" filing of the back articles of SINCUS NEWS-including a master index kept on VU-FILE so that you can find all of those articles pertaining to the subject you want!! This will take a few weeks but it is close. SINCUS is running classes in programming, the "world of hardware", and ZX-81 in addition to monthly meetings. Finally, I see the availablity of a "very expensive telecomminications network" for those that are interested - but it will actually be very cheap!

Carey

TIMEX by TIPS

MTERM SMART II HELP FILE

The transmit function supports X/ON - X/OFF protocol. Use CTRL S or CTRL Q.

The receive buffer may be OPEN/CLOSED remotely. Send CTRL R (open, decimal code 18) or CTRL T (close, decimal code 20).

Scroll pause when "VIEWing the BUFFer" use space bar ENTER to resume VIEWing.

Transmitting with the buffer OPEN and in HALF DUPLEX will fill the buffer with a copy of the transmitted data.

Transmitting or Receiving a program will require the BUFFER CON:HEX mode.

EXIT to BASIC with the BUFFER FULL may cause system to hang. (POWER OFF required)

DOWNLOADED programs with receive errors may not list, erasing buffer and second try may not work, even though the data is received correctly.

When TRANSMITTING a file the PROMPT STRING is is the string of characters the receiving terminal must send to start the transmission and after each line it must be repeated to send the next. Just ENTER will default to NO PROMPT STRING. The character delay may be set from 0 to 255. 0 is default.

********** PATCH FOR THE PATCH **********

The "MTERM SMART II PATCH for AERCO I/F" from the last nth issue of SINCUS creates a problem when auto-dialing, the modem does not "CONNECT" when the line is answered. Using the CAPS SHIFT & ENTER and "M" to make the CONNECT will work. The code that checks the print buffer and printer busy on a status read from the serial port is incorrect. To eliminate this problem, the following bytes must be changed in the patch procedure:

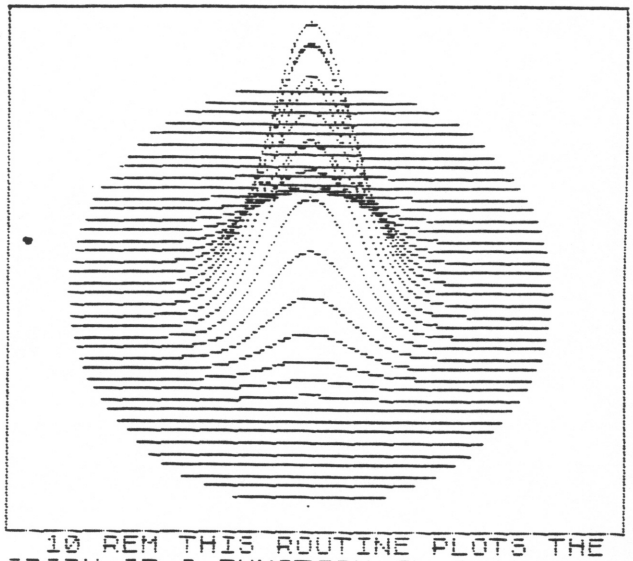
58755-245	58756-197	58757-229	58758-42	58759-176
58760-229	58761-237	58762-75	58763-174	58764-229
58765-237	58766-66	58767-32	58768-4	58769-225
58770-193	58771-241			

The patch when applied will cause the auto dial and the keyboard to be slower. This happens because the added code must check the print buffer and the status of the printer busy line each time the serial port status is read. If this response is not tolerable and you still desire to print to the AERCO I/F then the portion of the patch which prints data from the buffer can be installed by POKING just the data to locations 58618 to 58735.

Installing the patch may prove difficult because of the large number of locations which must be altered, compounded by the fact that one byte incorrect will cause unpredictable results. I have found that entering a BASIC program using DATA lines and FOR/NEXT loops works the best. This program can be saved on tape and each line edited if necessary. See example:

THE "MTERM PATCH PROGRAM" IS FULLY LISTED ON PAGE 4. LOAD THE "mterm" CODE and the type in the program and RUN. When all is done you should make the SAVE by

SAVE "patch" CODE 54016,7721



```
  10 REM THIS ROUTINE PLOTS THE
GRAPH OF A FUNCTION IN 3-D
  50 REM SET COLORS
  55 BORDER 4
  60 INK 0
  70 PAPER 6
  80 REM DRAW BORDER
  90 GO SUB 400
 100 REM DEFINE FUNCTION TO BE P
LOTTED
 105 REM
 110 REM THE IS CHANGED BYALTERI
NG THE CONTENTS OF LINE 150
 120 REM
 150 DEF FN A(Z)=90*EXP (-Z*Z/60
0)
 195 REM
 200 REM PLOT GRAPH
 205 REM
 210 LET K=5
 220 FOR X=-100 TO 100 STEP 1
 230 LET L=0
 240 LET P=1
 250 LET Z1=0
 260 LET Y1=K*INT (SQR (10000-X*
X)/K)
 270 FOR Y=Y1 TO -Y1 STEP -K
 280 LET Z=INT (80+FN A(SQR (X*X
+Y*Y))-.707106*Y)
 290 IF Z>L THEN GO TO 320
 295 GO SUB 380
 300 LET L=Z
 310 IF P=0 THEN GO SUB 380: IF
Z=Z1 THEN GO SUB 380
 320 PLOT X+125,Z
 330 IF P=0 THEN LET Z1=Z
 340 LET P=0
 350 NEXT Y
 360 NEXT X
 370 GO SUB 390
 380 RETURN
 390 STOP
 395 REM
 400 REM DRAW BORDER
 405 REM
 410 PLOT 0,0
 420 DRAW 255,0
 430 DRAW 0,175
 440 DRAW -255,0
 450 DRAW 0,-175
 460 RETURN
```